

## Evaluation Report for Category B, Subcategory 2.6 Application

**Application Number:** 2011-1412  
**Application:** Registration of a new combination of registered active ingredients  
**Product:** FRONTIER MAX PLUS  
**Registration Number:** 30519  
**Active ingredients (a.i.):** Dimethenamid-P and Atrazine (plus related active triazines)  
**PMRA Document Number :** 2065933

### Purpose of Application

The purpose of this application was to register a new end-use formulation, FRONTIER MAX PLUS, containing 204 g/L dimethenamid-P and 396 g/L atrazine, for control of grasses and broadleaf weeds when applied pre-plant incorporated, re-emergence, or early post-emergence in field and sweet corn. The use site categories are 13 and 14, terrestrial feed and food crops.

The applicant cited the registered herbicide tank mix of Frontier Max (Registration number 29194) and Aatrex Liquid 480 Herbicide (Registration number 18450) as a precedent combination of these active ingredients for use on field and sweet corn.

### Chemistry Assessment

FRONTIER MAX PLUS is formulated as a suspension containing dimethenamid-P at a nominal concentration of 204 g/L and atrazine at a nominal concentration of 396 g/L. This end-use product has a specific gravity of 1.12-1.13 and a pH of 3.5-6.0. The chemistry requirements for FRONTIER MAX PLUS are complete.

### Health Assessments

FRONTIER MAX PLUS is moderately acutely toxic by the oral route in rats; it is of low acute toxicity by the dermal and inhalation routes in rats. It is mildly irritating to the rabbit eye and skin. The formulation is a skin sensitizer in guinea pigs.

No new residue data were submitted to support the registration of the new end-use product FRONTIER MAX PLUS, containing dimethenamid-P and atrazine. As both active ingredients are currently registered for use on field corn and sweet corn at similar application rates and conditions, the registration of FRONTIER MAX PLUS will not result in an increase in dietary exposure to these active ingredients.

The use of FRONTIER MAX PLUS on field and sweet corn fits within the registered use pattern for dimethenamid-P and atrazine. The potential exposure for mixers, loaders, applicators and postapplication re-entry workers is not expected to exceed the current exposure to registered products, provided that workers follow label directions and wear personal protective equipment

as recommended on the label.

## **Environmental Assessment**

As the application rates, environmental precautions and mitigative measures are consistent with currently registered products containing dimethenamid-P and atrazine, additional environmental risk is not expected from the use of FRONTIER MAX PLUS on corn.

## **Value Assessment**

Data from a total of 22 field trials conducted in Ontario and Quebec in 1999, 2009, and 2010 were submitted. Efficacy of FRONTIER MAX PLUS applied pre-plant incorporated, pre-emergence, or early post-emergence (one to four leaf) at the rates of 1750 to 2040 g a.i./ha was directly compared to registered treatments of Frontier Max and atrazine applied pre-plant incorporated, pre-emergence, or early post-emergence at the same rates in terms of active ingredient per hectare. Visual percent control of redroot pigweed, common ragweed, lamb's-quarters, large and smooth crabgrass, green and yellow foxtail, barnyard grass, fall panicum, wild buckwheat, lady's-thumb, wild mustard, and Eastern black nightshade following the application of these treatments was evaluated on three occasions during the growing season.

Data indicated that the level of control of each of these weed species following the application of Frontier Max Plus was comparable to that observed following the application of the registered treatment of Frontier Max and atrazine over various locations and years. FRONTIER MAX PLUS was determined to be agronomically equivalent to the tank mixture of Frontier Max and atrazine when applied at the same rates in terms of active ingredient per hectare. Data from field research trials support claims of control of redroot pigweed, common ragweed, lamb's-quarters, large and smooth crabgrass, green and yellow foxtail, barnyard grass, fall panicum, wild buckwheat, lady's-thumb, wild mustard, and Eastern black nightshade with FRONTIER MAX PLUS applied pre-plant incorporated, pre-emergence, or early post-emergence at the labeled rates based on soil texture and soil organic matter content. Other labeled weed claims were extrapolated from the labels for either Frontier Max or Aatrex Liquid 480 Herbicide.

The efficacy of FRONTIER MAX PLUS at a reduced rate of 1290 g a.i./ha applied pre-emergence followed by glyphosate at 900 g a.e./ha applied post-emergence was evaluated for redroot pigweed, common ragweed, crabgrass (large and smooth), foxtail (green and yellow), lamb's-quarters, barnyard grass, and Eastern black nightshade. Data submitted support an early season control claim for redroot pigweed and an early season suppression claim for common ragweed, crabgrass (large and smooth), foxtail (green and yellow), lamb's-quarters, barnyard grass, and Eastern black nightshade. An early season suppression claim for giant foxtail was supported by data extrapolation from green and yellow foxtail.

The efficacy of FRONTIER MAX PLUS at a reduced rate of 1290 g a.i./ha in tank mix with glyphosate at 900 g a.e./ha applied early post emergence was reported for redroot pigweed, common ragweed, lamb's-quarters, crabgrass (large and smooth), barnyard grass, foxtail (green and yellow), wild buckwheat, lady's-thumb, and Eastern black nightshade. Data submitted support the season long control claims for these weeds. A season long control claim for giant foxtail was supported by data extrapolation from green and yellow foxtail and a season long

control claim for smartweed was supported by data extrapolation from lady's-thumb.

Tolerance of 12 field corn hybrids in 20 trials and one sweet corn variety in two trials to these treatments was reported 2-3 times during the growing season. Crop injury following application of FRONTIER MAX PLUS was either slight or not detectable over multiple locations and years, and was comparable to the registered tank mixture of Frontier Max and atrazine at the same rate in terms of active ingredient. Yield data confirmed that field corn exhibited an adequate margin of crop safety to FRONTIER MAX PLUS applied in accordance with the label.

The claim of crop tolerance for field corn treated with FRONTIER MAX PLUS was further supported since the herbicide tank mixture of Frontier Max at rates of up to 693 g a.i./ha and atrazine at rates of up to 1488 g a.i./ha is presently registered as pre-plant incorporated, pre-emergence, and early post-emergence treatments in field corn.

The claim of crop tolerance for sweet corn treated with FRONTIER MAX PLUS was further supported since each herbicide component of Frontier Max Plus, dimethenamid-P at rates of up to 693 g a.i./ha and atrazine at rates of up to 1488 g a.i./ha, is presently registered as pre-plant incorporated and pre-emergence treatments in sweet corn.

Rotational crop tolerance claims for Frontier Max and Aatrex Liquid 480 Herbicide were extrapolated to FRONTIER MAX PLUS because the maximum registered rate of the tank mix of Frontier Max and Aatrex Liquid 480 Herbicide includes the soil residual herbicide components dimethenamid-P and atrazine at rates that are similar to that which would be applied with FRONTIER MAX PLUS.

## Conclusion

Following the review of all available data, the use of FRONTIER MAX PLUS has been approved for control of grasses and broadleaf weeds when applied pre-plant incorporated, re-emergence, or early post-emergence in field and sweet corn.

## References

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